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The factor of safety, in one sense, is less than in Mr. Woodruff's apparatus due to the use of Acetone which forms the bath, it being a combustible material. This danger however is negligible as the solution is enclosed in a glass vessel and the heat is furnished by an electric bulb.

In another sense, that of the safety of the tissues which is the only excuse for the apparatus, the factor of safety is greater than in Mr. Woodruff's machine. This is due to the fact that the condenser eliminates the possibility of the bath evaporating to dryness and the consequent scorching of the tissues. Altogether the apparatus is very useful and one which when once used soon becomes a part of the permanent laboratory equipment.

ROBERT W. HENDERSON.

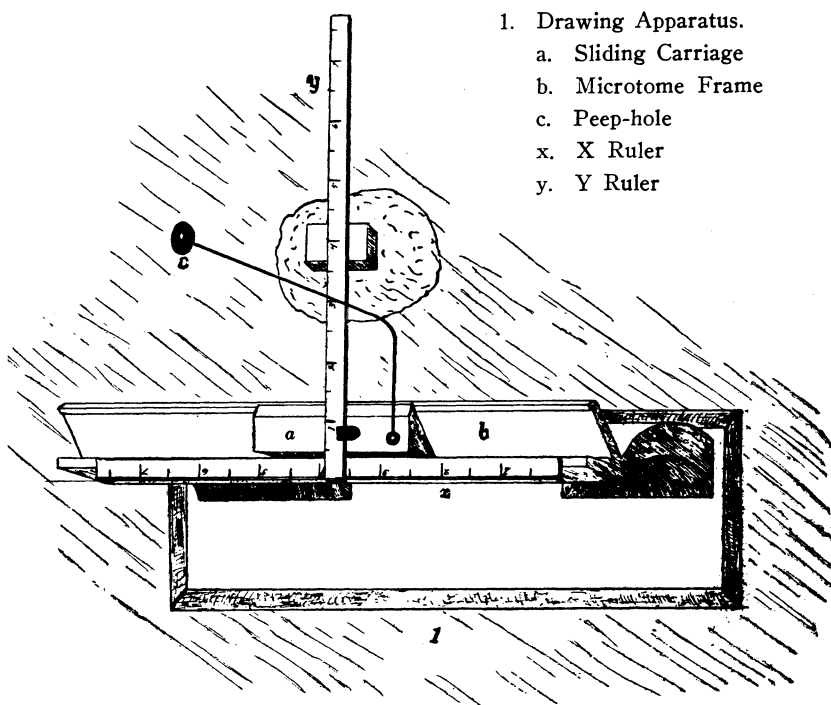
*Laboratories of Animal Biology,
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A MACROSCOPIC METHOD OF RECONSTRUCTION

In laboratory and research work good results can often be obtained by some make-shift application of materials already in stock which would otherwise require apparatus expensive and difficult to obtain. Such is an apparatus for the purpose of figuring to scale objects of great irregularity of form and surface which has been in use several months in the Animal Biology Laboratories of the State University of Iowa.

The apparatus is really a graphing device applying the principle of the X and Y axes, and is used in conjunction with ordinary graph paper. The materials were all found in the laboratory stock room and comprise a sliding celloidin microtome, two metric rulers, a piece of heavy wire about 18 inches long and some modelling wax.

One of the rulers, which is known as the X ruler, is fastened in a stationary position on the frame of the microtome near to the sliding knife carriage and parallel with its direction of motion. The other ruler, which is known as the Y ruler, is fastened to the sliding knife carriage in a horizontal position and at right angles to the stationary or X ruler. One end of the Y ruler overrides the X ruler, clearing it by about one-eighth of an inch.



1. Drawing Apparatus.
 - a. Sliding Carriage
 - b. Microtome Frame
 - c. Peep-hole
 - x. X Ruler
 - y. Y Ruler

APPARATUS FOR RECONSTRUCTION

The heavy wire is used to make a peep-hole a foot or so above the middle of the Y ruler and is attached to the sliding carriage. This peep-hole is used more especially with small objects so that the readings will all be taken from the same point thus giving greater accuracy.

In attaching the rulers and wire the microtome is not injured in the least as all the attachments are made by using screws and clamps already a part of the machine.

In operation the object to be figured is placed on the modelling wax under the Y ruler from which are taken the readings for the Y axis on the graph paper. Then beginning at one end of the object or the other the position of the Y ruler is read on the X ruler and the corresponding line located on the graph paper. Then

on this line are laid out points corresponding to certain desired points of the object which are read on the Y ruler. When all the points desired are located on this line the Y ruler is moved to any desired distance, as one millimeter, along the X ruler and on the new line corresponding to the new position of the Y ruler a new set of points is laid out according to the readings of the Y ruler. Then the Y ruler is again moved the desired distance and the readings repeated and so on until on the graph paper is made a figure in dots of the object. Now by connecting the dots by lines the figure, which is really a graph, is complete in outline.

After the figure is complete it may be transferred to a plate by means of carbon paper after which the completion of the figure by shading or stippling is an easy task, and should the drawing be spoiled in some manner another carbon tracing is easily secured.

As here described the apparatus will give a drawing of the object as seen from a line parallel with some axis of the object and it might be an improvement to use a stationary peep-hole above the center of the object which would give a drawing of the object as seen from one point.

As to accuracy each of these methods of using the peep-hole has its advantages. The first more nearly gives a vertical view of each point of the object which would perhaps be the ideal way for figures. On the other hand the second method would give a drawing more like a photograph. In either case the greatest accuracy is attained by making the interval between successive readings as small as possible. Further elimination of error may be accomplished by magnifying the drawing, which is done by multiplying the reading interval by some constant number, as five, and then minimizing to the desired size.

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AN EASILY ADJUSTED IMBEDDING BOX

Several types of imbedding boxes are used in histological laboratories, such as paper boxes, adjustable metal right angles and dishes of various sizes. All have their disadvantages so it seemed